

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

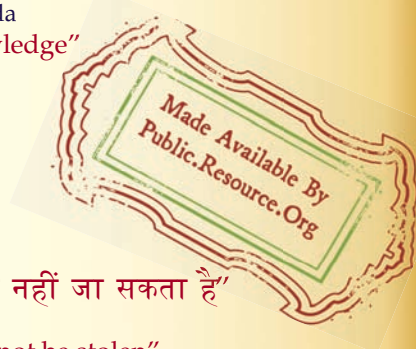
IS 14633 (1999): Blackboards for Class Rooms [PGD 22: Educational Instruments and Equipment]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



भारतीय मानक
कक्षाओं हेतु श्यामपट्ट — विशिष्टि

Indian Standard
**BLACKBOARDS FOR CLASS ROOMS —
SPECIFICATION**

ICS 97.140

© BIS 1999

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Educational Instruments Sectional Committee had been approved by the Light Mechanical Engineering Division Council.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2:1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

BLACKBOARDS FOR CLASS ROOMS — SPECIFICATION

1 SCOPE

This standard covers the dimensional, functional and general requirements of blackboards for class rooms.

2 REFERENCES

The following Indian Standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	Title
399:1963	Classification of commercial timbers and their zonal distribution
1659:1990	Block boards (<i>third revision</i>)
1993:1993	Single cold-reduced tinplate and single cold - reduced blackplate—electrolytic and hot-dipped tinplate sheet and blackplate sheet (<i>third revision</i>)

IS No.

Title

2835:1987	Flat transparent sheet glass (<i>third revision</i>)
3087:1985	Wood particle boards (medium density) for general purposes (<i>first revision</i>)
3097:1980	Veneered particle boards (<i>first revision</i>)

3 TYPES

Blackboards shall be manufactured in the following four types:

Type I	Ordinary blackboards with one (single-sided) or two (double-sided) working surface (<i>see</i> Fig. 1)
Type II	Hinged or folding blackboards with one or several additional rotating working surfaces (<i>see</i> Fig. 2)
Type III	Sliding blackboard with working surfaces moving horizontally (<i>see</i> Fig. 3)
Type IV	Rolling type blackboards with an elastic working surface (<i>see</i> Fig. 4)

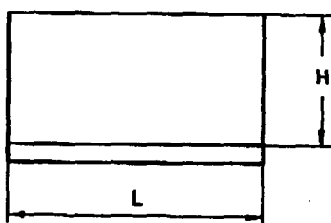


FIG. 1 BLACKBOARD, TYPE I

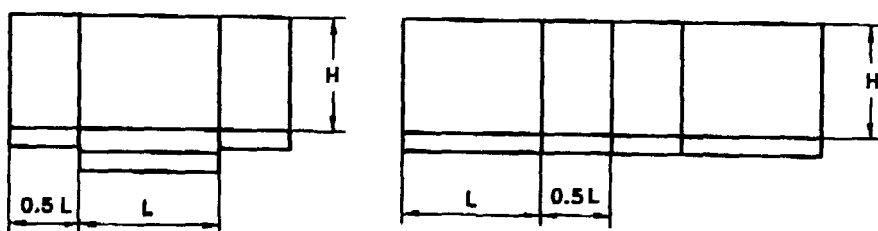


FIG. 2 BLACKBOARD, TYPE II

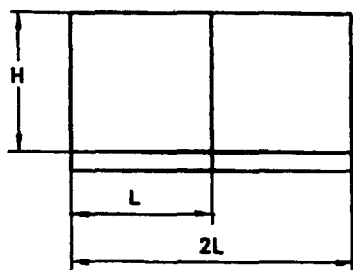


FIG. 3 BLACKBOARD, TYPE III

4 DIMENSIONS

4.1 Sizes

The recommended sizes of the working surfaces of the class room blackboards shall be as given in Table 1.

Table 1 Recommended Sizes for Class Room Blackboards

Type	Height (H), mm	Length (L), mm
I	800, 900, 1 000, 1 100 and 1 200	900, 1 000, 1 200, 1 500, 1 600, 1 700, 1 800, 2 000, 2 400 and 3 000
II	900, 1 000, 1 100 and 1 200	1 500, 1 700, 1 800, 2 000 and 2 400
III	900, 1 000, 1 100 and 1 200	900, 1 200, 1 500, 1 700 and 1 800
IV	1 000, 1 500 and 2 000	900-1 000, 1 300-1 600 and 1 800-2 000

NOTE — Combination of length and height may be selected from the table depending on the size of the class room and the orientation of the seats.

4.2 Tolerances

The tolerances on height and length shall be ± 10 mm.

5 MATERIALS FOR BASE AND WORKING SURFACE

5.1 Base of the Blackboards

The materials recommended for base of blackboard shall be as given below and shall conform to the relevant Indian Standard:

- | | |
|--|---------|
| a) Blockboard | IS 1659 |
| b) Veneered particle boards | IS 3097 |
| c) Wood particle boards (medium density) | IS 3087 |

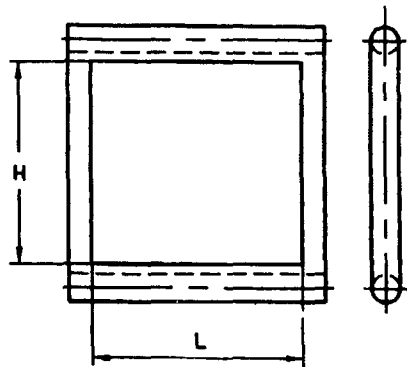


FIG. 4 BLACKBOARD, TYPE IV

- | | |
|---|---------|
| d) Timber — <i>aini, anjan, bijasal, safed siris, etc</i> | IS 399 |
| e) Thin sheet (steel) | IS 1993 |

5.2 Working Surface of Blackboards

The materials recommended for working surface of blackboards shall be as given below and shall conform to the relevant Indian Standard:

- | | |
|--|---------|
| a) Polyvinyl chloride linoleum on a fabric underwarp | — |
| b) Polyvinyl chloride linoleum, multilayer without underwarp | — |
| c) Plate glass | IS 2835 |

6 TECHNICAL REQUIREMENTS

6.1 The moisture contents of the parts made from bulky wood shall be 8 ± 2 percent. Moisture contents of the parts made of wooden materials shall be as specified in the relevant Indian Standard of these materials.

6.2 The glue used shall not cause change in the colour of the working surface of the blackboards.

6.3 The coating of the working surfaces and the finishing of the blackboards shall allow cleaning with warm water containing detergents and disinfectants.

6.4 The working surfaces of the blackboards shall be even and shall not have stripes, streaks, bubbles, scratches, spots, creases, peelings and other visible defects.

6.5 The coating of the working surfaces of the blackboards shall have uniform colouring over the entire area. The colour of the coating shall be dark green, dark brown, black with reflection factor between 20 to 30 percent.

6.5.1 Reflection Factor of the coating may be determined by the method described in Annex A.

6.6 The coating of the working surfaces of the boards shall have mat finish and ensure excellent visibility of the text and drawings carried out with chalks or special markers and shall also ensure their erasing.

6.7 Throughs for chalk dust shall be provided along the lower edge of the working surface of the classroom boards.

6.8 The sliding boards of Type I and the rotating elements of the boards of Type II shall be double-sided.

6.9 Clamps shall be provided above the working surface of the board in order to fasten the tables and charts. For sliding clamps a slide way may be provided along the upper edge of the working surface of the boards.

6.10 The design of the stationary boards shall be such that they may be fastened reliably.

6.11 The design of the sliding boards shall be such that they remain stable and do not move while working on them.

6.12 Classroom boards and its accessories which are on the front surface of the board shall not have burrs, fins on the end faces of the runners. Welded seams shall be smoothened.

6.13 All types of lifting-type boards shall move vertically, and the sliding elements of the boards of Type III shall freely move in horizontal plane without skewing and jamming. In boards of Type II there shall be devices which prevent spontaneous rotating of the hinged boards.

6.14 The devices, accessories and fasteners which are on the rout surface of the board shall have protective coating.

6.15 Warping of the working surface shall not be more than 5 mm per metre length along the diagonal of the board.

6.16 The components and the assemblies of the boards that can be taken into parts and reassembled shall be manufactured with an accuracy to ensure assembling and dismantling of the board in one attempt without additional adjustment.

6.17 An instruction manual specifying the assembly, dismantling and maintenance of the board shall be provided with each blackboard.

7 MARKING

Blackboards shall be marked with the manufacturer's name or trade-mark, year of manufacture or Code Number.

7.1 BIS Certification Marking

The product conforms to this standard may also be marked with Standard Mark.

7.1.1 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

8 PACKING

Packing of blackboard shall be as agreed to between the supplier and the purchaser.

ANNEX A (Clause 6.5.1)

DETERMINATION OF REFLECTION FACTOR FOR BLACKBOARD

A-1 APPARATUS

- a) Collimeter
- b) Sensing device

A-2 METHOD OF TEST

A-2.1 A beam of light from the collimeter is made to strike at a pre-determined point on the blackboard. The reflected beam is made to fall on a sensing device (see Fig. 5A) and its intensity

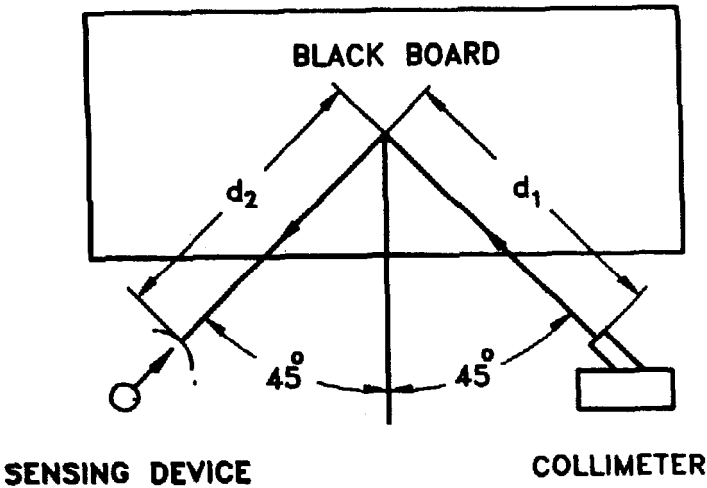
(designated as X) is noted. The distance between the collimeter and the blackboard, that is, d_1 and the distance between the blackboard and the sensing device, that is, d_2 are so adjusted that a significant reading is shown by the sensing device.

A-2.2 The intensity of light is again measured by placing the sensing device directly facing the collimeter at a distance of $(d_1 + d_2)$ as shown in Fig. 5B. This reading of the sensing device is designated as Y .

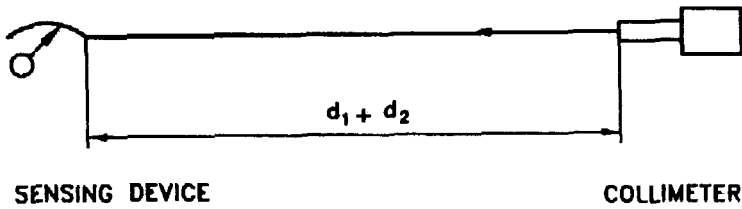
A-2.3 The percentage reflection factor of the blackboard is calculated as follows:

This is repeated for minimum 5 different points on the blackboard so as to cover the entire area on the blackboard.

Percentage reflection factor = $\frac{X}{Y} \times 100$



5A Method for Determination of 'X'



5B Method for Determination of 'Y'

FIG. 5 METHOD FOR DETERMINATION OF REFLECTION FACTOR

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act*, 1986 to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards: Monthly Additions'.

This Indian Standard has been developed from Doc: No. LM 22 (5265).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002
Telephones : 323 01 31, 323 33 75, 323 94 02

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :

Telephone

Central	Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110 002	{ 323 76 17 323 38 41
Eastern	1/14 C. I. T. Scheme VII M, V. I. P. Road, Kankurgachi CALCUTTA 700 054	{ 337 84 99, 337 85 61 337 86 26, 337 91 20
Northern	SCO 335-336, Sector 34-A, CHANDIGARH 160 022	{ 60 38 43 60 20 25
Southern	C. I. T. Campus, IV Cross Road, CHENNAI 600 113	{ 235 02 16, 235 04 42 235 15 19, 235 23 15
Western	Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400 093	{ 832 92 95, 832 78 58 832 78 91, 832 78 92
Branches :	AHMEDABAD, BANGALORE, BHOPAL, BHUBANESHWAR, COIMBATORE, FARIDABAD, GHAZIABAD, GUWAHATI, HYDERABAD, JAIPUR, KANPUR, LUCKNOW, NAGPUR, PATNA, PUNE, RAJKOT, THIRUVANANTHAPURAM.	